

Influence of Oxalic Acid Concentrations on The Growth of Molybdenum Disulfide via Spin Coating Technique

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Abstract. In this context, the molybdenum disulfide (MoS₂) films were grown by spin coating technique and thermal vapour sulfurization (TVS) under the condition of different oxalic acid concentrations. Atomic force microscopy (AFM) surface topography shows the improved homogeneity and higher compactness of films with the increasing acid concentration. However, high concentration favoured the formation of larger grains and poor continuity of films. These observations were further proven by the particle size distribution profile. Apart from that, two distinct Raman phonon modes of the MoS₂ can be detected in all the deposited films. In addition, molybdenum dioxide (MoO₃) was detected at higher acid concentration due to the slower rate of diffusion of sulfur atoms during the surface sulfurization. From the direct analysis of frequency difference between in-plane (E_{2g}¹) and out-of-plane (A_{1g}) phonon modes, it proves that multilayers of MoS₂ films were synthesized. Ultraviolet visible (UV-Vis) specular reflectance